

User Experience Evaluation of BPOM Mobile Application Using User Experience Questionnaire and Focus Group Discussion Method

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ABSTRACT

The Indonesian Food and Drug Authority (BPOM) as a government agency has developed the BPOM Mobile application to make it easier for the public to check the safety of drug and food products in circulation. From the research results, several user experience problems were found on BPOM Mobile, especially in the scan product feature. User experience evaluation needs to be carried out to measure the comfort felt by the user and determine the user's level of understanding of the application being used. This research aims to evaluate the user experience on BPOM Mobile using the User Experience Questionnaire and Focus Group Discussion methods. The sampling technique used was purposive sampling which was based on the criteria of public users who had used the scan product feature and were 18-25 years old and had a sample size based on the User Experience Questionnaire guidelines of 30 people. Respondents were 6 users who were willing to do a Focus Group Discussion exploring perceptions and problems in detail related to 6 aspects of the User Experience Questionnaire and aspects of visual aesthetics. The research results show that the BPOM Mobile application currently has a neutral user experience score on the attractiveness, perspicuity, efficiency, dependability, and novelty scales and a positive user experience score on the stimulation scale. The problems obtained were corrected through a prototype and resulted in positive user experience values in all aspects.

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1. INTRODUCTION

The increasingly rapid development of technology can be seen in the creation of many products and services produced by individuals and organizations to support the goals they want to achieve. These products and services are created in various forms, namely website, desktop, or mobile-based applications. One sector that utilizes mobile technology is electronic-based government services or e-government. The government agency that has the authority to monitor drugs and food in circulation is the Indonesian Food and Drug Authority (BPOM). The public can make efforts to be aware of medicines and food in circulation by checking products through public services based on mobile application technology that has been developed by BPOM.

One of the main factors that influence the failure or success of an e-government system is user experience (Yastin et al., 2021). This is because these government services will be applied by people with various backgrounds (Aniesiyah et al., 2018). Public services are BPOM's main priority which can be seen from the development of the BPOM Mobile application. BPOM Mobile is an application that makes it easy for people to check the safety of drug and food products registered with BPOM by looking for the distribution permit number and scanning the QR code on the product label. However, currently, the BPOM Mobile application rating is still below 4.0 on Android and iOS devices. Based on observations and negative user reviews, various kinds of problems were found, including errors and delays when scanning products, difficulties when using a Scan Product feature, and not being able to scan products using images from the gallery.

User experience evaluation needs to be carried out to measure comfort and determine the user's level of understanding of the application used. So, if users want to have a good user experience, the product must be easy to learn, efficient to use, or well controlled with additional criteria such as aesthetics, pleasure of use, and novelty or attractiveness (Hinderks et al., 2019). Interface design and design aesthetics are related to producing an interface that is considered comfortable and easy to use, aesthetics also attracts the interest of potential users targeted at a design (Auliazmi et al., 2021). Thus, to measure the level of user experience a product has, evaluation is needed using the UEQ questionnaire and adding qualitative methods in the form of FGD.

User Experience Questionnaire (UEQ) has been used by companies to evaluate products and has good measurements (Hussain et al., 2018). The advantages of UEQ include having complete aspects including attractiveness, pragmatic quality, and hedonic quality (Wijaya et al., 2021). Several studies have applied UEQ as a method for evaluating user experience, namely research conducted by Kushendriawan et al. (2021) to evaluate the user experience of the Halodoc application which produces positive user

experience scores because all scales are in the good category. Another research was also conducted by Wulandari and Farida (2018) using UEQ to assess the level of experience of e-learning users at XYZ University which resulted in feedback recommending improvements. Apart from that, research conducted by Anwar and Priharsari (2021) also used the UEQ method to explore the need for improvements to the J-PTIIK website and showed the results of user experience levels below normal levels on all scales.

Several studies also use Focus Group Discussion (FGD) as a method for evaluating user experience, such as research conducted by Jayana and Priharsari (2022) to improve UEQ results in measuring user experience on two websites and seeking user views on the two sites in more depth. Another similar study was also conducted by Adinegoro et al. (2018) applied Focus Group Discussion as a method to obtain perceptions and problems from three e-commerce websites that were tested on respondents. Meanwhile, research conducted by Izabal et al. (2018) also used the FGD method to obtain negative and positive perceptions from participants and seek recommendations for solutions desired by participants for FILKOM Apps problems.

Therefore, based on the problems mentioned, this research conducted an evaluation of the BPOM Mobile user experience using the User Experience Questionnaire method to determine the value and level of user experience and find out where aspects of the user experience need improvement using the Focus Group Discussion method to obtain perceptions and details of the problems experienced related to various aspects of UEQ and aspects related to interface design, namely visual aesthetics. This research provides recommendations for solutions in the form of improved design prototypes to improve the quality of user experience so that the perceptions of BPOM Mobile users can be more positive.

2. RESEARCH FRAMEWORK

The user experience of a product can be evaluated using several methods, one of which is using the UEQ and FGD approaches. The UEQ method is an easy-to-apply, valid, and reliable method with subjective quality assessment (Laugwitz et al., 2008). The UEQ consists of 26 items grouped into 6 scales representing different aspects of UX quality (Hinderks et al., 2019). The FGD method is a type of qualitative data collection method that consists of a group of participants together with researchers who gather as a group to discuss a research topic (Mack et al., 2005). Focus groups aim to collect various perspectives from discussion group participants (Anwar & Priharsari, 2021). Focus groups require 5 to 10 participants with recommendations of 6 to 8 participants guided by a moderator who controls the focus of the group to discuss a problem and focus on user interface features with a discussion time duration ranging from 60 to 90 minutes (Adinegoro et al., 2018).

This research uses a mixed methods approach. Mixed methods is a type of research that aims to understand a research problem by collecting, analyzing, and combining quantitative and qualitative methods in a research flow (Vebrianto et al., 2020). The quantitative approach in this research was carried out using the UEQ questionnaire to collect data on the level of user experience of the BPOM Mobile application, while the qualitative method approach in this research was carried out through Focus Group Discussions with several users to identify in detail the problems and user perceptions according to experienced when using BPOM Mobile. It is hoped that combining these two methods will produce suggestions for improving the user experience of the BPOM Mobile application.

The user experience aspect that is evaluated is taken from the UEQ aspect which consists of three categories, namely the attractiveness aspect, the pragmatic quality aspect, and the hedonic quality aspect. Apart from that, there are additional aspects that are evaluated, namely the visual aesthetics aspect. Evaluation of attractiveness aspects includes perceived attractiveness and impression, evaluation of pragmatic quality aspects (perspicuity, efficiency, dependability) includes perceived functional quality, efficiency, and ease of use, while evaluation of hedonic quality aspects (stimulation, novelty) includes pleasure of use and novelty of the product. Meanwhile, evaluating the visual aesthetics aspect is related to the beauty of the interface design.

3. RESEARCH METHOD

3.1 Sampling

This research uses samples for questionnaires and samples for FGD. The sampling technique used in this research is purposive sampling technique. According to Huda (2020), purposive sampling is a sampling technique obtained based on predetermined criteria. The sample criteria in this research are public users of the BPOM Mobile application, have used the scan product feature when checking product safety, and 18-25 years old. The 18-25 year age range has the highest level of knowledge regarding the BPOM Mobile application compared to other age groups (Dewi & Jabbar, 2021).

Determining the number of questionnaire samples in this study was determined by following the guidebook from the UEQ handbook. According to Schrepp (2019), product evaluations of 20 to 30 people have provided fairly stable results. Therefore, this research will take a questionnaire sample of 30 respondents. Meanwhile, the number of FGD samples in this study was 6 user resource persons in accordance with predetermined criteria and were part of the questionnaire respondents who were willing to be interviewed further.

3.2 Research Instrument

This research instrument uses a questionnaire that was prepared based on the UEQ method using Indonesian and distributed twice, namely at the evaluation stage of the old design and evaluation of the improved design. Filling out the questionnaire will be directed in accordance with the UEQ provisions. Users can assess the quality of a product as measured by 26 statement items. Each item of the UEQ is in the form of a seven-stage semantic differential, namely consisting of several terms with opposite meanings that can be measured on a 7-point Likert scale with values ranging from -3 (answer completely agrees with the negative term) to +3 (answer completely agrees with the positive term) (Schrepp et al., 2017). Following are several UEQ items statement on each scale that have been adapted in Indonesian which can be seen in Table 1.

Table 1. Item statements on each UEQ scale

Scale	Item statement		Code	Adapted by
Attractiveness	Menyusahkan	Menyenangkan	A1	(Santoso et al., 2016)
	Baik	Buruk	A2	
	Tidak disukai	Menggembirakan	A3	
	Tidak nyaman	Nyaman	A4	
	Atraktif	Tidak atraktif	A5	
	Ramah pengguna	Tidak ramah pengguna	A6	
Perspicuity	Tidak dapat dipahami	Dapat dipahami	P1	
	Mudah dipelajari	Sulit dipelajari	P2	
	Rumit	Sederhana	P3	
	Jelas	Membingungkan	P4	
Efficiency	Cepat	Lambat	E1	
	Tidak efisien	Efisien	E2	
	Tidak praktis	Praktis	E3	
	Terorganisasi	Berantakan	E4	
Dependability	Tidak dapat diprediksi	Dapat diprediksi	D1	
	Menghalangi	Mendukung	D2	
	Aman	Tidak aman	D3	
	Memenuhi ekspektasi	Tidak memenuhi ekspektasi	D4	
Stimulation	Bermanfaat	Kurang bermanfaat	S1	
	Membosankan	Mengasyikkan	S2	
	Tidak menarik	Menarik	S3	
	Memotivasi	Tidak memotivasi	S4	
Novelty	Kreatif	Monoton	N1	
	Berdaya cipta	Konvensional	N2	
	Lazim	Terdepan	N3	
	Konservatif	Inovatif	N4	

Meanwhile, during the FGD, this research asked 7 questions to the FGD participants to get answers regarding the perceptions and problems experienced by the participants while using BPOM Mobile. Then several participants were able to provide suggestions or recommendations for improving BPOM Mobile which stemmed from the problems they had experienced.

3.3 Data Analysis

UEQ data analysis was carried out twice, namely at the UEQ analysis stage in evaluating the old design and evaluating the improved design of the BPOM Mobile application. UEQ data can be processed using the UEQ Data Analysis Tool in Excel form to interpret the results accurately and easily (Paramitha et al., 2018). User experience measurement in this research was carried out using the UEQ Data Analysis Tool by calculating the average value of the 6 UEQ scales. Measurement results will be obtained automatically by entering questionnaire data into Excel. The average value on each scale is obtained in the form of a graph of the average UEQ scale to determine the level of user experience achieved. If the average value is more than 0.8, it is a positive result, if the average value is less than -0.8, it is a negative result, and the average value between -0.8 to 0.8 is a neutral result. Next, a benchmark is carried out on each scale which is categorized based on the benchmark interval of the UEQ method, namely excellent, good, above average, below average, and bad. The FGD data analysis process is a coding and categorizing process, namely identifying, naming, categorizing, and decomposing perception data and problems resulting from the FGD based on questions for each aspect that have been validated by two IT experts.

4. RESULT AND DISCUSSION

4.1 Demographic

Based on data from 30 respondents, the majority of respondents were female, namely 23 respondents (77%), while male respondents were 7 respondents (23%). The age range of respondents was 22-25 years as many as 25 (83%), while in the age range 18-21 years there were 5 (17%). The majority of respondents' occupations were students with 17 respondents (57%), while 8 respondents had private employee jobs (27%), 1 respondent had civil servant jobs (3%), 3 respondents had self-employed jobs (10%), and teacher work as much as 1 respondent (3%). Based on the intensity of use, the majority of respondents were rarely 15 respondents (50%), sometimes 9 respondents (30%), and often 6 respondents (20%).

4.2 Validity and Reliability Test Result

Validity testing was carried out in this research using SPSS version 25 to evaluate whether the statement items used were successful in measuring what they were supposed to measure (valid). If $r_{\text{count}} > r_{\text{table}}$ using a significance level (α) = 0.05 then

the question items on the instrument used can be declared valid (Rohmah & Ary, 2021). This research carries out validity tests on a portion of the specified samples so that testing can be carried out quickly and efficiently. The number of samples tested was 20 respondents so that the r table could be used to test validity with a value of 0.444. Table 2 presents the results of test the validity questionnaire in all items. The 26 items on the instrument used in this study are all valid with r-count values above 0.444.

Table 2. Validity test results

Item	R Count	Information
A1	0.718	Valid
P1	0.558	Valid
N1	0.484	Valid
P2	0.487	Valid
S1	0.547	Valid
S2	0.492	Valid
S3	0.498	Valid
D1	0.594	Valid
E1	0.528	Valid
N2	0.537	Valid
D2	0.454	Valid
A2	0.575	Valid
P3	0.612	Valid
A3	0.639	Valid
N3	0.514	Valid
A4	0.625	Valid
D3	0.556	Valid
S4	0.504	Valid
D4	0.499	Valid
E2	0.522	Valid
P4	0.553	Valid
E3	0.526	Valid
E4	0.527	Valid
A5	0.610	Valid
A6	0.521	Valid
N4	0.446	Valid

The reliability test in this research was carried out using SPSS version 25 to find out whether the data obtained through the questionnaire was consistent and reliable. Analyzing data using UEQ, can be said to be consistent if the value of the Cronbach Alpha coefficient is equal to or more than 0.6 (Mardiani & Tanjungan, 2022). Table 3 presents the results of testing the reliability of the questionnaire in all items. The 26 items in this study are reliable or consistent because they have Cronbach's Alpha values above 0.6.

Table 3. Reliability test results

Cronbach's Alpha	N of Items
0.900	26

4.3 UEQ Measurement Results of BPOM Mobile

The user experience value produced by each UEQ scale is known from the results of the average calculation on each UEQ scale which is calculated by carrying out data transformation based on respondents' answers. A mean value of more than 0.8 represents a positive evaluation, a mean value of less than -0.8 represents a negative evaluation, and a mean value ranging from -0.8 to 0.8 represents a neutral evaluation. The evaluation results of the average user experience value for each UEQ scale on the BPOM Mobile application can be seen in Table 4.

Table 4. The average value for each UEQ scale of BPOM Mobile

Scale	Average	Information
Attractiveness	0.789	Neutral Evaluation
Perspicuity	0.733	Neutral Evaluation
Efficiency	0.775	Neutral Evaluation
Dependability	0.725	Neutral Evaluation
Stimulation	1.008	Positive Evaluation
Novelty	0.350	Neutral Evaluation

Based on Table 4, the results showed that the BPOM Mobile application according to the UEQ scale has a neutral user experience value on the attractiveness, perspicuity, efficiency, dependability, and novelty scale because it has an average value between -0.8 to 0.8 and has a positive user experience value on the stimulation scale because it has a value the average is more than 0.8. Next, the average value for each UEQ item is obtained and a differentiating color code is given for each scale on BPOM Mobile which can be seen in Figure 1.

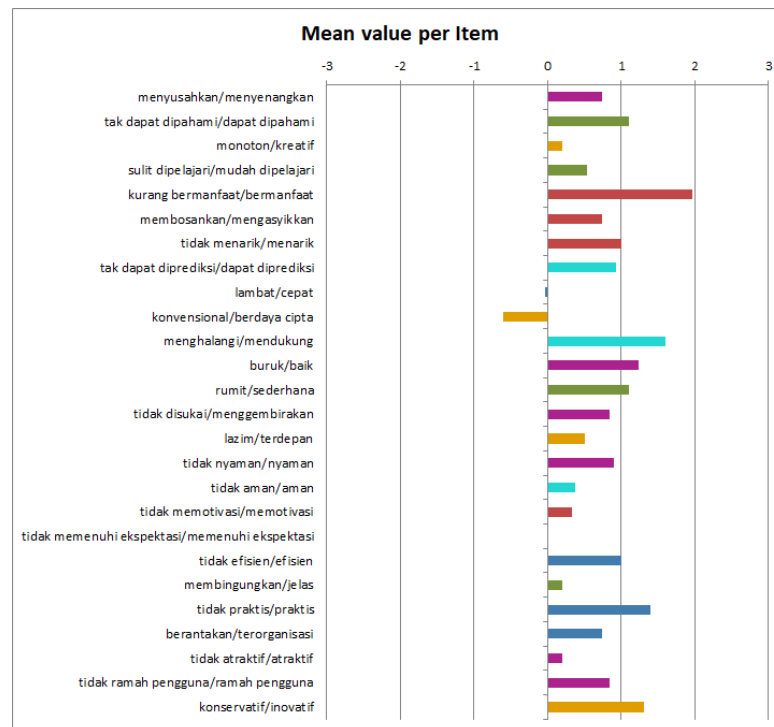


Figure 1. The average value for each UEQ item of BPOM Mobile

Based on Figure 1, the results showed that several UEQ items mostly have neutral scores with the lowest scores on lambat or cepat items, konvensional or berdaya cipta items, and tidak memenuhi ekspektasi or memenuhi ekspektasi items. After the average value for each item and scale is obtained, the next step is to carry out a UEQ benchmark by comparing the average value of the UEQ measurement results on the old BPOM Mobile design against the benchmark data set to see the relative quality of the application and the adequacy of the user experience design. The old BPOM Mobile application was compared with 468 product evaluation data from other UEQ study results based on 2023 benchmark data in Data Analysis Tool version 12. The following are categories of UEQ benchmark results on the old BPOM Mobile design which are presented in Figure 2.

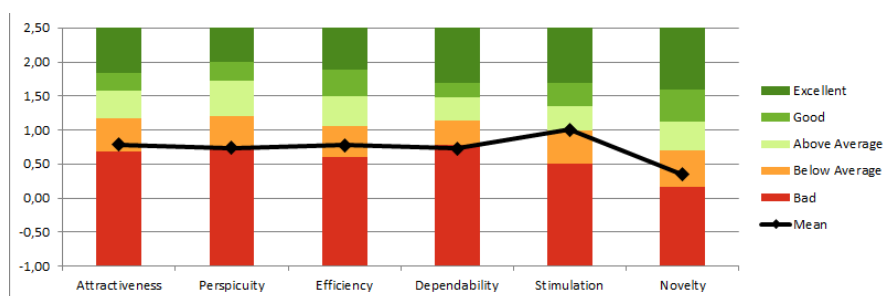


Figure 2. Benchmark UEQ results diagram of BPOM Mobile

Based on the diagram in Figure 2, the results show that on the scale of attractiveness, perspicuity, efficiency, and novelty it is in the below-average category. Meanwhile, on the dependability scale, it gets a bad category and on the stimulation scale, it gets the above average category. Based on the results of measuring the user

experience values that have been obtained, it can be concluded that there are still deficiencies in the BPOM Mobile application scan product feature. Therefore, to find out the problem of these deficiencies in detail, a Focus Group Discussion was carried out.

4.4 Focus Group Discussion Analysis Results

The results of the FGD are in the form of participant's answers regarding negative and positive perceptions of the experience of using the scan product feature of the BPOM Mobile application. These perceptions were then grouped into each aspect according to the FGD participant's answers to questions that had been validated on the aspects of attractiveness, perspicuity, efficiency, dependability, stimulation, novelty, and visual aesthetics. Perceptions and problems obtained from the FGD results for each aspect can be seen in Table 5.

Table 5. The FGD results for each aspect

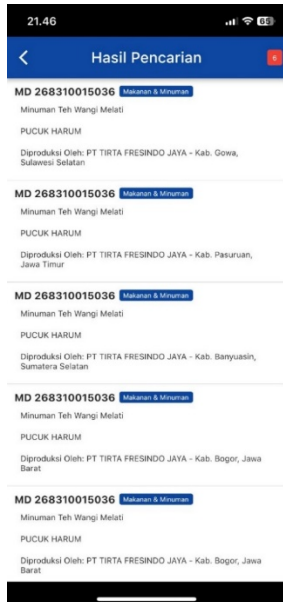
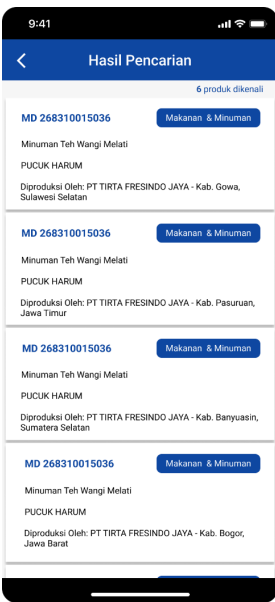
Aspect	Code	Perceptions and Problems
Attractiveness	PA-1	The text in the product list of search results is not suitable for all groups to read because the text size is too small.
	PA-2	The font size on the product information detail page is less comfortable to read because the font size is small and the font color of the content is not clear.
Perspicuity	PP-1	The icon for the number of product lists that is similar to the notification form makes users feel ambiguous in understanding the function of the icon. Apart from that, its placement makes users feel confused and less informative.
	PP-2	There is no guide to using the scan product feature on the scan page so if they experience difficulties, users are confused because there is no help.
	PP-3	When the product is not found, a pop-up appears which makes the user confused because there is no close button to exit the pop-up.
Efficiency	PE-1	When the scan product is recognized, a pop-up dialog appears which is quite complicated because the user needs to click the button again to check the details, the user should be able to go straight to the product list page.
	PE-2	When the user gets to the detailed product information page, the user can't go straight back to the main page and the user has to click the back button to the previous pages, so it's a waste of time if the user wants to go to the homepage.
	PE-3	Requesting location services when a user wants to scan a product is annoying because it only adds more effort before using the scan feature.
	PE-4	When the user clicks the back button on the search results page, the user cannot immediately return to the homepage, so there are too many actions such as adding more effort to use the application.

Aspect	Code	Perceptions and Problems
Dependability	PD-1	The scan results did not meet expectations because sometimes the results appeared and sometimes the results did not appear, and the shape of the scan camera was not suitable for checking QR codes because it seemed like it could also check long barcodes.
	PD-2	Users cannot predict whether when carrying out a scan it will run smoothly if they cover the numeric barcode from the camera beam.
	PD-3	It is ambiguous or not clear which one should be scanned, when barcodes in the form of QR codes with rectangular barcode numbers are close together, making it difficult for the system to recognize which barcode will be scanned, resulting in results that do not match expectations.
	PD-4	Sometimes the scan detects the long barcode part, not the QR code, and the result is that if the long barcode part is scanned, the product is not recognized. The camera frame should be square so that the long barcode part is not highlighted by the camera.
	PD-5	The shape of the scan camera in the form of a long box on the scan page does not match its function, namely to scan QR codes.
Stimulation	PS-1	The scan product feature is useful because it can help in checking products to find out whether they are safe or not according to BPOM standards and to obtain information about the products they own.
Novelty	PN-1	Sometimes some cameras are not clear when used directly or the camera is damaged, so users need an image import feature from the gallery so user can still get product safety information from images that contain a QR code.
Visual aesthetics	PV-1	The icons on the scan product page are too large and inconsistent.
	PV-2	The placement of the icon on the scan page is too close to the bottom.
	PV-3	The table with detailed product information looks untidy because the contents are packed together and the column spacing is too tight.
	PV-4	The text layout on the search results page is not neat and the appearance looks monotonous.
	PV-5	The text "Laporkan?" on the unknown pop-up page it is too close to the text " Produk Tidak Dikenali".

4.5 Improvement Design Recommendation of BPOM Mobile

Every recommendation for improvement obtained from the results of the FGD evaluation in this research was then made into an improvement design solution which was ready to be evaluated in the form of a high-fidelity prototype. The improved design recommendation and new feature recommendation can be seen in Table 6 and Table 7.

Table 6. Improvement design recommendation

Page	Old Design	Improvement Design	Information
Scan Product			The scan camera box is changed to a square shape to represent the shape of the QR code. Then, to improve the appearance, we adjusted the icons to make them more consistent with a medium size, added space and tidied up the position of the icons on the scanned page. The flow improvement in this page is before using the scan product, namely the location access request pop-up was removed, and after performing the scan product, the product pop-up dialog was removed so that the user does not put in more effort.
Search Result			The appearance was improved by increasing the font size, improving the text layout, and providing a different font color for the distribution permit number on the search results page. Then, the information in the form of product number icons is converted into sentences and placed above the product list. The flow that has been improved on this page is that the back button from the search results is made to lead directly to the homepage.

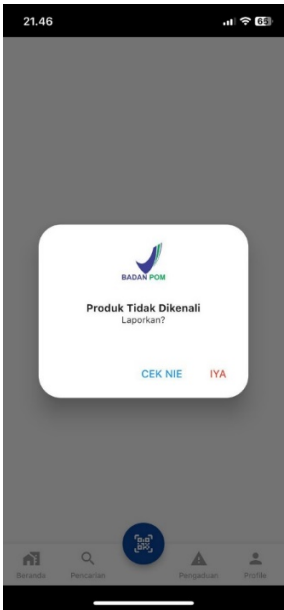
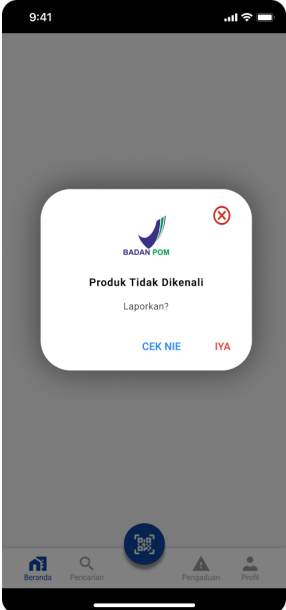
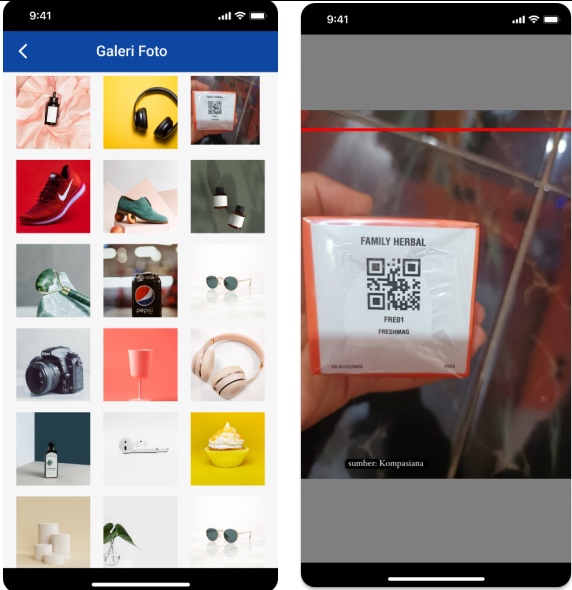
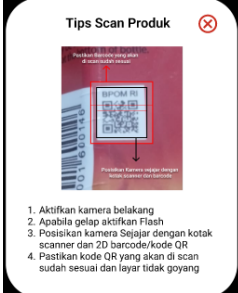
Page	Old Design	Improvement Design	Information
Product Information			The appearance has been improved by increasing the font size and clarifying the font color of the contents on the product information detail page. Apart from that, improving the horizontal layout of the product information column by providing the same distance so that they are not close together so that the contents can be easily read and look neat, as well as bringing up a bottom navbar on the product information detail page to make it easier for users to move to the homepage.
Unrecognized Product Pop-up			Add a close button in the form of a close icon and provide space between the text "Produk Tidak Dikenali" and the text "Laporkan?" in the pop-up if the product is not recognized.

Table 7. New feature design recommendation

Feature	New Feature Design	Information
Import Images from Gallery		Provides the addition of an image import feature from the gallery which can be accessed via the scan product page, this feature contains a photo gallery page and a scan page from the photo gallery.
Tips scan product		Add a help feature in the form of pop-up scan product tips to make it easier for users to operate the scan product feature. The new design adds pop-up scan product tips which can be accessed via the scan product page

4.6 UEQ Measurement Results of Improvement Design

BPOM Mobile users who provided assessments on this second questionnaire were the 30 respondents to the first questionnaire who were contacted again via WhatsApp. The assessment is carried out based on opinions and experiences experienced or felt by users while using the design prototype for scan product feature improvement of the BPOM Mobile application in Figma. The average user experience value on each UEQ scale from the evaluation results of the BPOM Mobile application improvement design can be seen in Table 8.

Table 8. The average value for each UEQ scale of improvement design

Scale	Average	Information
Attractiveness	1.989	Positive Evaluation
Perspicuity	2.100	Positive Evaluation
Efficiency	2.067	Positive Evaluation
Dependability	1.700	Positive Evaluation
Stimulation	1.633	Positive Evaluation
Novelty	1.358	Positive Evaluation

Based on Table 8, the results showed that BPOM Mobile application improvement according to the UEQ scale has a positive user experience value on each scale because the average value obtained is above 0.8. The next step to see the quality and adequacy of the user experience of the improvement design for the scan product feature of the BPOM Mobile application is to carry out a UEQ benchmark. The following are UEQ benchmark result categories for improvement designs which are presented in Figure 3.

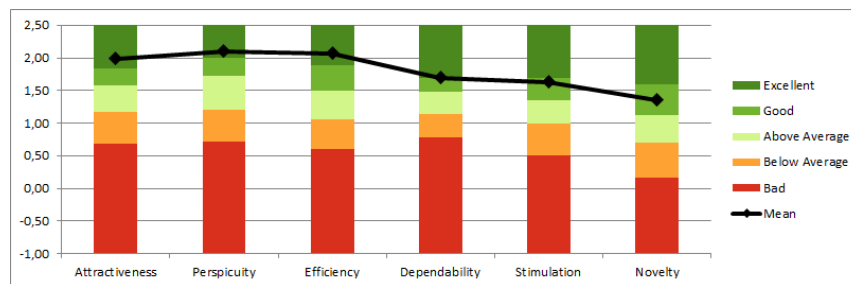


Figure 3. Benchmark UEQ results diagram of improvement design

Based on the UEQ benchmark results, it was found that the improved design for the scan product feature of the BPOM Mobile application received the excellent category on the scale of attractiveness, perspicuity, and efficiency. Meanwhile, on the scale of dependability, stimulation, and novelty, the category is good. Thus, it can be concluded that the BPOM Mobile application's scan product improvement design gets a more positive perception from its users and has a better user experience benchmark value category than the old design of the BPOM Mobile application.

5. CONCLUSION

The user experience value on the BPOM Mobile scan product feature currently according to the UEQ scale has a neutral user experience value on the attractiveness, perspicuity, efficiency, dependability, and novelty scale and has a positive user experience value on the stimulation scale. Then, according to the UEQ benchmark results, the user experience level was obtained in the below-average category on the attractiveness, perspicuity, efficiency, and novelty scale, the bad category on the dependability scale, and the above-average category on the stimulation scale. In the Focus Group Discussion (FGD) 20 negative perceptions and problems were found. After recommendations for improvement designs were made, the resulting user experience value increased according to the UEQ scale, namely having a positive user experience value on all scales with the UEQ benchmark value being in the excellent category on the attractiveness, perspicuity, and efficiency scale and being at the good category on the dependability, stimulation and novelty scale.

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